

Notice of Allowability

Application No.

10/711,623

Examiner

Toniae M. Thomas

Applicant(s)

LEE ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on 10 May 2005.
2. ☒ The allowed claim(s) is/are 1-10.
3. ☒ The drawings filed on 29 September 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/708,227.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 05312005.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
2. Belinda Lee gave authorization for this examiner's amendment via an Internet communication on 30 May 2005.
3. The application has been amended as follows:

In Claims

Claim 1 has been replaced with the following:

1. A dynamic random access memory (DRAM) structure, comprising: a substrate with a trench therein; a capacitor formed inside the trench; an active region surrounded by an isolation region formed over the substrate; a word line formed over the substrate and passed through the active region, wherein an area in the active region covered by the word line serves as a channel region; a pair of source/drain regions within the active region formed on each side of the word line such that the source/drain regions connect with the capacitor and a bit line respectively; and a doped region with dopants in a conductive type identical to that of the substrate formed on each side of the channel region **laterally** adjacent to the isolation region.

Claim 6 has been replaced with the following:

6. A dynamic random access memory (DRAM) structure, comprising: a substrate with a plurality of trenches therein; a capacitor formed within each trench; a plurality of active regions surroundeded by an isolation region formed over the substrate; a plurality of word lines running in a first direction formed

over the substrate; a plurality of source/drain regions and a plurality of common source/drain regions formed within various active regions such that a pair of source/drain regions and a common source/drain region together form a group inside each active region; a plurality of bit lines running in a second direction formed over the substrate; and a plurality of doped regions formed in the substrate such that dopants inside the doped region ~~has~~ have a conductive type identical to that of the substrate, wherein all four side edges of each active region have a pair of trenches such that the capacitor in one of the trenches in each pair of trenches along the second direction is coupled to the active region and the capacitors in the pair of trenches along the first direction are coupled to other active regions, a pair of adjacent word lines passes through the active region and the two pairs of trenches along the first direction and the areas in the active region covered by the word lines serve as two channel regions, moreover, the doped regions are formed on each side of each channel region laterally adjacent to the isolation region, and each source/drain region within each active region is electrically connected to a capacitor and the common source/drain region is electrically connected to a bit line.

Reasons for Allowance

4. The following is an examiner's statement of reasons for allowance: the prior art of record does not anticipate or render obvious a DRAM structure substantially as claimed. For example, the closest prior art, Hsu et al. (US 5,994,198) discloses a DRAM structure. However, the Hsu et al. patent (Hsu) differs from the claimed invention in that Hsu does not anticipate, teach or suggest a DRAM structure substantially as claimed, wherein the DRAM comprises **a doped region with dopants in a conductive type identical to that of the substrate formed on each side of the channel region laterally**

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adjacent to the isolation region. There is no teaching or suggestion within the prior art of record to modify the DRAM structure of Hsu such that the DRAM structure comprises **a doped region with dopants in a conductive type identical to that of the substrate formed on each side of the channel region laterally adjacent to the isolation region.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMT
31 May 2005



Mary Wilczewski
Primary Examiner